



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Applicant: Takanori ITOU et al.
Title: POSITIVE ELECTRODE MATERIAL
FOR NON-AQUEOUS ELECTROLYTE
LITHIUM ION BATTERY AND
BATTERY USING THE SAME
Appl. No.: 10/581,858
International Filing Date: 11/29/2004
371(c) Date: 06/30/06
Examiner: Jonathan G. LEONG
Art Unit: 1725
Confirmation Number: 4646

REPLY BRIEF

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This communication is responsive to the Examiner's Answer dated October 6, 2011.
In addition to the previously filed Appeal Brief, please consider the following remarks.

I. Grounds of Rejection to be Reviewed on Appeal

The Examiner indicates on page 5 of the Examiner's Answer that the only rejection that remains to be reviewed on Appeal is the rejection of claims 1-3 and 6 under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 6,071,649 ("Mao") in view of U.S. Patent Publication No. 2003/0157409 ("Huang"), as evidenced by Japanese Patent Publication No. 07-245105 ("Nagayama").

II. The rejection of claims 1-3 and 6 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Mao in view of Huang, as evidenced by Nagayama should be reversed.

The rejection of claims 1-3 and 6 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Mao in view of Huang, as evidenced by Nagayama should be reversed for at least the reasons explained in the previously filed Appeal Brief, and for the following additional reasons.

A. Neither Mao, Huang, nor Nagayama, alone or in combination, discloses, teaches, or suggests “a lithium compound deposited on the surface of the oxide, wherein the lithium compound is lithium sulfate.”

As discussed in Applicants’ Appeal Brief, neither Mao, Huang, nor Nagayama, alone or in combination, discloses, teaches, or suggests “a lithium compound deposited on the surface of the oxide, wherein the lithium compound is lithium sulfate.”

First, Mao does not, in fact, teach that LiNiO_2 can be coated with “any known positive active material” to obtain the performance benefits discussed in Mao. The Examiner now argues that “Mao discloses that as long as the surfaces of the LiNiO_2 particles are modified by coating with another material, the particles become less moisture sensitive and more stable with respect to capacity.”¹ The Examiner then concludes that “[s]ince Mao discloses that as long as LiNiO_2 particles are not directly in contact with the electrolyte, i.e., the LiNiO_2 particles are coated with another material, the performance benefits are obtained (Mao: C3/L1-7), one having ordinary skill in the art at the time of the invention would have found it obvious to coat LiNiO_2 particles with any known positive active material so to obtain said performance benefits.”² Applicants strongly disagree.

The portion of Mao cited by the examiner reads as follows:

During charge/discharge cycling, an inactive layer can develop on the surface of LiNiO_2 particles, causing an increase in surface resistance and a decrease in the capacity of the material.

¹ See Examiner’s Answer at pages 8-9.

² See Examiner’s Answer at page 9.

If the surfaces of the LiNiO_2 particles are modified by coating with another material, the particles become less moisture sensitive and more stable with respect to capacity.³

However, the Examiner has, respectfully, taken this quote out of context. Mao does not suggest that the coating material can be *any* material. Nor does it suggest that the coating material can be *any* positive active material. Rather, Mao suggests that the coating material can be any *lithium transition metal oxide material*. Prior to the portion of Mao cited by the Examiner, Mao states:

According to the present invention, the material is coated with a second *lithiated transition metal oxide material*, preferably LiCoO_2 or $\text{LiCo}_x\text{Ni}_{1-x}\text{O}_2$, where x is between 0.98 and 1.1. In one preferred embodiment, the electrode material is LiNiO_2 coated with LiCoO_2 .⁴

Immediately following the portion of Mao cited by the Examiner, Mao states:

Coating the LiNiO_2 particles with lithium cobalt oxide or cobalt-doped lithium nickel oxide is preferred since cobalt is less sensitive to moisture than is nickel and since cobalt has a high charge efficiency and stable capacity. LiNiO_2 coated with LiCoO_2 or $\text{LiCo}_x\text{Ni}_{1-x}\text{O}_2$ according to the present invention therefore results in an electroactive material that has both stable high capacity and high initial charge efficiency.⁵

The MPEP demands that “[a] prior art reference must be considered in its entirety, i.e., as a *whole*”⁶ When considered *as a whole*, Mao does not suggest that the coating material can be any positive active material, but rather than the coating material can be any *lithium*

³ See Mao at column 3, lines 1-7.

⁴ See Mao at column 2, lines 55-58.

⁵ See Mao at column 3, lines 7-14.

⁶ MPEP § 2141.02(VI) (emphasis in original).

transition metal oxide material. In other words, the genus of coating materials suggested in Mao is “lithium transition metal oxide materials.” The preferred species within that genus, according to Mao, are “lithium cobalt oxide or cobalt-doped lithium nickel oxide.”

Claim 1, of course, recites a lithium sulfate coating material. Lithium sulfate is not within the genus of coating material suggested in Mao. Sulfur is not a transition metal. Thus, lithium sulfate is not a ***lithium transition metal oxide material.***

Second, Huang does not, in fact, remedy the deficiencies of Mao. The Examiner now alleges that “Huang was relied upon to teach commonly known positive electrode active materials and provide a finite number of solution of commonly known choices for positive electrode active materials which includes LiCoO_2 , lithium carbonate (Li_2CO_3), and lithium sulfate (Li_2SO_4) (Huang: Claim 5), [t]hus fulfilling the requirement of providing a finite number of solutions to the recognized problem.”⁷ The Examiner appears to have narrowed the finite number of solutions to “positive electrode active materials” after the fact, in order to encompass the coating materials in the prior art (lithium transition metal oxide materials and lithium carbonate) and the coating material of claim 1 (lithium sulfate). As discussed above, Mao does not suggest limiting the possible coating materials to “positive electrode active materials.” Nor does Huang or Nagayama. The Examiner’s use of hindsight to determine the scope of the “finite number of solutions” is impermissible under Federal Circuit precedent and the MPEP, which states that “[i]t is difficult but necessary that the decisionmaker forget what he or she has been taught . . . about the claimed invention and cast the mind back to the time the invention was made (often as here many years), to occupy the mind of one skilled in the art. MPEP § 2141.01(III) (citing *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983)).

As discussed in the Applicants’ Appeal Brief, there are an unfathomably large number of materials that could possibly be deposited on the surface of the oxide of claim 1. But even in the unlikely event that a person of ordinary skill would be somehow be motivated to choose a deposition material from the active materials disclosed in Huang, the potential number of materials is enormous. Huang discloses that “the active material of the positive

electrode element is selected from the group consisting of lithium intercalation compounds, lithium salts, lithium oxides.”⁸ Even the specific examples of these compounds given in Huang is quite large, including over twenty-six different materials.⁹ To find that the large number of materials disclosed in Huang are “finite number of identified, predictable potential solutions” would fly in the face of the Federal Circuit’s precedent regarding the correct use of the “obvious to try” rationale.¹⁰

For at least these reasons, claim 1 is patentable over Mao, Huang, and Nagayama, in any combination.

B. The unexpected results achieved by the invention embodying claim 1 demonstrate that claim 1 is not obvious over Mao, Huang, and Nagayama, either alone or in any combination.

As discussed in Applicants’ Appeal Brief, The unexpected results achieved by the invention embodying claim 1 demonstrate that claim 1 is not obvious over Mao, Huang, and Nagayama, either alone or in any combination.

The Examiner maintains that “the evidence of unexpected results is deficient at least since it is not reasonably commensurate in scope with the prior art . . . because the evidence has a coating of lithium carbonate while Mao discloses a coating of lithium cobaltate.”¹¹ The MPEP states that “[a]n affidavit or declaration under 37 CFR 1.132 must compare the claimed subject matter with the *closest prior art* to be effective to rebut a prima facie case of obviousness.”¹² At the time the Saito Declaration was filed, the closest references cited by the Patent Office were Nagayama and U.S. Patent No. 5,427,875 (“Yamamoto”), both of which

⁷ See Examiner’s Answer at page 11.

⁸ See Huang at claim 5.

⁹ *Id.*

¹⁰ See, e.g., *Perfect Web v. Infousa*, 587 F.3d 1324, 1331 (Fed. Cir. 2009) (holding that a claim to a method of managing bulk email distribution was obvious where there were only *three potential solutions* to a recognized problem); *Bayer Schering Pharma AG v. Barr Lab.*, 575 F.3d 1341, 1350 (Fed. Cir. 2009) (holding that a pharmaceutical composition was obvious where there were only *two potential solutions* to a recognized problem).

¹¹ See Examiner’s Answer at page 12.

¹² MPEP § 716.02(e) (citing *In re Burckel*, 592 F.2d 1175, 201 USPQ 67 (CCPA 1979)) (emphasis added).

teach an electrode material comprising lithium nitride coated with lithium carbonate. This is why evidence was presented comparing lithium sulfate and lithium carbonate. Applicants fail to see how Mao is any "closer" to the combination of claim 1 than Nagayama and Yamamoto. The coating materials of Mao, Nagayama, and Yamamoto are all completely different than the coating material of claim 1. Thus, the Examiner's failure to consider the evidence of unexpected results provided by the Applicants was, respectfully, improper.

III. Conclusion

In view of the foregoing, it is respectfully requested that the Board reverse the rejections of claims 1-3 and 6.

Respectfully submitted,

Date 11/30/2011

By Michael D. Kaminski

FOLEY & LARDNER LLP
Customer Number: 22428
Telephone: (202) 672-5490
Facsimile: (202) 672-5399

Michael D. Kaminski
Attorney for Applicant
Registration No. 32,904

Chase J. Brill
Attorney for Applicant
Registration No. 61,378